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December 19, 1996

Office of the Secretary
Federal Communications Commission
1919 M Street N.W. Room 222
Washington, D.C. 20554

DOCKET FILE COPY ORIGINAL

Dear Sir:

Enclosed is my response to Federal Communications Commission CC Docket Number 96-45 and four copies. Copies have been sent via overnight mail to the Universal Service Branch and the International Transcription Service.

Sincerely,

J. Roger Guard sec

J. Roger Guard

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RESPONSE TO FCC CALL FOR COMMENTS (cc Docket No 96-45)

Introduction

The questions asked were converted into a survey form and administered to two main telemedicine providers involved with rural areas. Overall, the specific questions were easier to answer than the general ones. The time period for gathering the information and clarifying it was short, and will need to be longer in the future. Also, the breakdown of specific communications categories beyond the three given and the "other" category. For sites in the state of Ohio, answering these questions should not be too difficult since the state already has initiatives underway for "leveling" the costs for the most generally useful overall telecommunications line, the T1. Following are comments specific to the two telemedicine providers. Attached to this commentary are summarized results from a survey of telemedicine and distance learning/education rural sites working with various programs underway in association with the University of Cincinnati.

Discussion

Within the state of Ohio there are several important state sponsored programs in place to initiate or improve telecommunications, distance education, electronic outreach, and distance medicine, or telemedicine. Two of these, the State of Ohio Multi-Agency Communications System (SOMACS), and School-Net programs are helping to even the telecommunications disparity between urban and rural healthcare institutions, educational institutions, libraries, and public agencies within the state of Ohio. The core of the SOMACS program is to offer a state-wide standard rate for point-to-point T1 lines from schools, hospitals, public agncies, and other state sponsored facilities. This rate is $560 per month for a video quality T1 line (and $450 per month for audio quality). The first group of lines are currently being installed and tested now, with a full schedule to be undertaken in calendar year 1997. The School-Net program was established to bring networking to every classroom in Ohio. It is expected that these programs will spur rural communities to fund local initiatives which will connect local schools, health care facilities, libraries, and other public agencies together and to the outside urban and neighboring rural communites and facilitate distance learning, telemedicine, and collaborative studies. These initiatives should also stimulate local telephone providers to imrove local services, and come more in-line with comparitive services offered in the urban centers of the state.

Clinical Telemedicine and Medical/Nursing Education

A good example of the above programs and initiatives being put in effect can be gleaned from the activities under way in Adams County, the poorest county in the state of Ohio. The Adams County Hospital, in West Union, has become the first functioning clinical telemedicine facility in southern Ohio. Through a cooperative effort with the University of Cincinnati, the Adams County Hospital obtained a matching funds type grant from the US Rural Electrification Administration to establish a clinical telemedicine and distance education program which uses a full T1 line and an multi-conferencing unit bridge to high schools in the county. The first phase of the $350,000 grant has been completed and clinical telemedicine sessions are being scheduled between physicians located at the University Hospital in Cincinnati and patients at the Adams County Hospital, using a compressed video/audio technology for that component of the session (1/2 T1) and the other half of the T1 for data transmission associated with various electronic-clinical instruments and media. Although the costs of this T1 line amount to about $4,000 per month presently, it is expected that they will be replaced by a $560 per month SOMACS video quality T1 line in the near future. Phase 2 of this project, to be started very soon, will extend the communications using other SOMACS T1 lines to four newly constructed high schools which will have SchoolNet funded local area networks and specially constructed distance learning classrooms. A series of routers, inverse multiplexors, and a switched MCU bridge will complete the connections and a separate SOMACS line to the A site for internet services in Columbus will also be included. Thus, for community members in attendance at the high schools in the county, medical education for professionals, nurse training, community health programs such as NetWellness, and other services can be conducted from Cincinnati or even between the schools in Adams County. Costs are in the more affordable range.

NetWellness

Although the state of Ohio has determined to make T1 lines available at reasonable prices for everyone in rural or urban areas, there are many successful instances of telemedicine within the state using ISDN speeds and technologies. The NetWellness community health information system, also run out of the University of Cincinnati, in conjunction with the Cincinnati Chamber of Commerce, uses ISDN technology to directly communicate with libraries, pharmacies, hospitals, and other health centers in Hamilton, Clermont, Brown, and Clinton counties in Ohio. This facility can also be reached from the Internet.

NetWellness is an electronic consumer health library delivered to rural residents of southern Ohio and southeastern Indiana and urban and suburban communities in the Greater Cincinnati tri-state region over heterogeneous telecommunications networks. Forty-three public workstations placed in hospitals, clinics, pharmacies, community centers, public libraries, and similar venues are key access points. Members of regional community networks and "Free-Nets" can also access most of NetWellness, as can those who have access to the World Wide Web. NetWellness was seeded by a grant from the NTIA, with additional funding from the National Action Plan on Breast Cancer, the State of Ohio, and numerous public and private, corporate and civic partners.

NetWellness' objectives are to

- Provide easy, equitable, and widespread access to health related information resources to the general public in the Ohio Valley region, particularly rural Appalachian and urban minority populations;
- Provide comprehensive training programs for these health information resources by working with community and regional partners;
- Use the existing telecommunications and hardware infrastructure to extend health information resources to as many citizens of the Ohio Valley region as possible;
- Contribute to extending the information superhighway to all citizens of the Ohio Valley regions; and
- Facilitate health care reform by contributing to the health education and awareness of the Ohio Valley.

The 29-county NetWellness service area includes the Cincinnati-Hamilton Consolidated Metropolitan Statistical Area and the Dayton-Springfield Metropolitan Statistical Area in southwest Ohio. The next largest city is Athens, Ohio, in southeast Ohio, population 59,549 (1990 Census); in between are primarily rural areas of three states, including some of Ohio's poorest counties.

NetWellness workstations are located in

- 13 libraries,
- 12 clinic/practice centers,
- 9 hospital clinics,
- 3 senior centers,
- 3 Public television and community video centers,
- 2 pharmacies, and
- 1 cancer education mobile van.

Fourteen sites are rural. In southern Ohio alone, four major and many smaller local exchange carriers (LECs) divide the region into multiple Local Access Telephone Areas (LATAs). Some rural residents are still without telephone service, while many of their neighbors are limited to "Plain Old Telephone Service" (POTS) access to dial-tone or have few advanced calling features. The cost of obtaining medium- or high-speed telecommunications links across LATAs can be prohibitive. Where the LEC physical plant is not up-to-date, it may be simply impossible.

The Netwellness public computers are connected in several ways: via Ethernet backbone, Ethernet local area network (LAN), Frame Relay, Integrated Services Data Network (ISDN), leased lines, dial-up Serial

Line Internet Protocol/Point-to-Point Protocol (SLIP/PPP) service at 28.8 thousand bits per second (Kbps), or a combination thereof. TSO maintains redundant 128 Kbps ISDN links to UC, and connects to the Internet via its own T1 (1.5 Mbps) service. TSO also supports separate free text-only dial-in connections. The following table illustrates NetWellness telecommunications connections:

No.	Type	Bandwidth	Urban/Rural
10	Ethernet	64 Kbps - 10 Mbps	7 Urban/3 Rural[1]
23	ISDN	128 Kbps	21 Urban/2 Rural[2]
9	SLIP/PPP	28.8 Kbps	Rural
1	Cellular Packet	28.8 Kbps	N/A (Mobile)

Ethernet connections, linked by pathways ranging in capacity from 64 Kbps to 1.5 Mbps or higher, are the first choice for NetWellness. Almost all of the Ethernet connections are in urban locations; Ohio University supports three of them, two by extending access to its COREnet Frame Relay system to provide higher-speed links than would otherwise be available (64 Kbps and 128 Kbps). Another beneficial collaboration appears at the site in Middletown, Ohio, where the public library was slated to be connected eventually to the Ohio Public Library Information Network (OPLIN), a program that is connecting all 250 library systems in the state to the Internet via T1 lines. Through arrangements with OPLIN, Middletown's installation was moved forward and their T1 connection to the Internet is used to access NetWellness also.

ISDN connections, the NetWellness second choice after Ethernet, are also predominantly found in urban locations. SLIP/PPP is used for the remaining fixed sites which have no Ethernet or ISDN access. These sites are all in rural locations, where no other options exist. Because of the absence of a local ISP, three of these sites must dial through their LEC and a long distance carrier to reach an Internet service provider (TriState Online) in Cincinnati. While these three installations have been relatively stable, especially given the complexity of their arrangements, the cost to maintain these connections after the grant period may be prohibitively expensive. Also, slow response time is a regular complaint from users at those sites. The other six SLIP/PPP-connected sites use a local ISP. A local phone connection accesses the ISP's server which establishes an Internet connection to the NetWellness servers. Although costs are low and predictable, many of the connections have not been stable. One site's experience illustrates the problems which can occur when dealing with multiple telecommunications providers--as is the rule, rather than the exception, in rural areas. At this site, a reliable SLIP connection could not be established or maintained for more than a short time. Literally weeks of effort on the part of technical and administrative staff of the public access site, NetWellness, the ISP, and the LEC (a major provider of rural telephone services) were required to determine why. Only after all equipment and software had been swapped out for known working versions, with still no improvement, did the LEC finally ascertain that they had, in fact, reversed the polarity of the telephone line when it was installed.

NetWellness developers have learned that SLIP/PPP connections are more expensive, less capable, and less reliable than either Ethernet or ISDN:

- Labor costs for SLIP/PPP installation and maintenance are higher;
- Reliability and dependability of SLIP/PPP is lower than Ethernet/ISDN; and
- 28.8 Kbps is inadequate bandwidth for the images required in a well-designed consumer health Web site.

They have found that cost (per bits per second) and bandwidth (in bits per second), and bandwidth and reliability show dual inverse relationships. That is, lower bandwidth solutions such as SLIP/PPP dial-up

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[1] Of the 3 rural sites, one has a direct connection to the Ohio University (OU) network, while two others, located in Athens and Marietta, Ohio, are connected to the OU College of Osteopathic Medicine's COREnet Frame Relay system.

[2] The 2 rural sites noted are both in Clermont County in southwestern Ohio, and benefit from widespread availability of ISDN within Cincinnati Bell Telephone's extensive local calling area.

connections are in fact more costly and less reliable for their usefulness. Higher bandwidth solutions, where available, are easier to maintain and more robust for their cost. Low-speed Internet connections do not serve the health information needs of consumers, let alone those of health care professionals.

Information Summary

Following is the questionnaire and summary summary information used in this brief trial.

FCC Survey
Telecommunications and Health Care

Project Name: NETWELLNESS NTIA PROGRAM, UNIVERSITY OF CINCINNATI HOSPITAL TELEMEDICINE PROGRAM, COLLEGE OF NURSING NTIA GRANT, ADAMS COUNTY HOSPITAL REA GRANT

Respondent Name:) (VARIOUS)

Directions

Please address answers and comments in the context of your specific project for the "Specific Questions" section. For the "General Questions" section, answer those questions for which you have general knowledge or opinions, based on your overall experiences within the state of Ohio.

SPECIFIC QUESTIONS	ISDN	1/4 T1 (384 Kbps)	T1 (1.54 Mbps)	OTHER (What Level?)	COMMENTS
What level of bandwidth are you currently using?	24 SITES FOR NETWELLNESS USE 128K	NONE - PROPOSED ONLY	ADAMS CTY, USES 768KBPS FOR VIDEO/AUDIO, 768 KBPS FOR DATA	DS3 TO BROWN CTY PLANNED	
What is monthly rate for this service? (On average.)	$250 ON AVERAGE, NOT AVAILABLE IN ADAMS CTY.	$384 , $368, $344, $1,400	$3,990 PER MONTH TO ADAMS COUNTY FROM UC.	$1,500 PER MONTH PLUS $7,000 INSTALLATION	
What is the rate for this service in the nearest urban area?	$110 AND DROPPING	VARIES, ABOUT $300 ON AVERAGE	ABOUT $410 ON AVERAGE		

What monthly rate would you pay if you were to order the other levels of listed service instead?			$560 UNDER SOMACS		
What is the rate for these other levels of service in the nearest urban area?			$560 UNDER SOMACS		
Would an infrastructure upgrade be required to provide you with any of these service levels? What would it cost?	YES, GTE WOULD NEED TO GET EQUIPMENT. COST UNKNOWN.	NO	NO		
If any level of bandwidth were available to you at the rate charged for the same service in the nearest urban area, which level would you choose?	T1	T1	THIS ONE - THE PRICE IS GOOD FOR THE SERVICE LEVEL.		

If local access to the Internet is not available, what is your monthly expenditure to reach an ISP?

"A" SITE ACCESS IS AVAILABLE. PLANS ARE TO USE A SOMACS T1 TO ACCESS THE "A" SITE.

Are you charged for traffic between Local Access and Transport Areas (LATAs) at rates above those paid by customers in the nearest urban area of your state? (i.e, Are there mileage charges included in the rate that you are being charged?)

NOT UNDER SOMACS. THE CHARGES ARE FOR A FULL T1, POINT-TO-POINT, ANYWHERE IN THE STATE FOR $560 PER MONTH (VIDEO QUALITY).

What is the relative value, in terms of quality of care, of access to ISDN, 384 Kbps, and T1 level service or the equivalent? Which levels of bandwidth are necessary for the provision of which types of health care services? Please be specific. (i.e. If you are sending a chest x-ray of a patient in critical condition, how much does your level of bandwidth matter?)

ANY INFORMATION RESOURCES BEYOND SIMPLY TEXTUAL ARE DIFFICULT TO DELIVER WITH LOWER BANDWIDTHS. IMAGES FOR DIAGNOSTIC USE WILL REQUIRE HIGHER BANDWIDTHS, EVEN USING COMPRESSION WHICH COULD CAUSE SLIGHT DISTORTIONS, DEPENDING ON THE COMPRESSION SCHEME.

How would you compare the use of telemedicine to other types of health care delivery? What are your reasons for using telemedicine in a given instance? Are there specific benefits of using telemedicine that should be identified for decision makers?

TELEMEDICINE EXTENDS THE ACADEMIC HEALTH SCIENCES CENTERS' INFORMATION RESOURCES TO THE ISOLATED HEALTH PROFESSIONAL AND RURAL HEALTH CARE INSTITUTIONS

General Questions (Your comments/opinions please)

1. How many rural health care providers eligible for universal service support are using telemedicine? Where are they located?

ONLY 1 USES DIAGNOSTIC TELEMEDICINE, ADAMS COUNTY HOSPITAL. ABOUT 5 SITES USE NETWELLNESS. THEY ARE IN BROWN COUNTY, CLERMONT COUNTY, GEORGETOWN AND PEEBLES SOHSN SITES ARE ALSO TELEMEDICINE/TELELIBRARY SITES THAT WERE ESTABLISHED UNDER A GRANT WITH UC.

2. How many rural health care providers eligible for universal service support are not currently using telemedicine? Where are they located? What level of infrastructure buildout is available to them?

UNKNOWN

3. At what rate are eligible rural health care providers being created or shut down?

NETWELLNESS SITES GO UP AT ABOUT 1 PER MONTH IN RURAL AREAS, ADAMS COUNTY AND BROWN COUNTY HAVE TAKEN ABOUT A YEAR TO COME UP. NONE HAVE BEEN SHUT DOWN SO FAR.

4. Where and at what rate are Internet service providers (ISPs) expanding in rural areas of the country? Can you estimate the costs of providing toll-free access?

UNKNOWN

5. Do insular areas experience a disparity in telecommunications rates between urban and rural areas? (Please supply demographic information including the size of cities in these areas.)

YES, FOR EXAMPLE ADAMS COUNTY RATES FROM GENERAL TELEPHONE AND ELECTRONICS ARE ABOUT DOUBLE AND ADAMS COUNTY DOES NOT OFFER ISDN.

6. Are technological changes expected to increase or decrease the demand for bandwidth for telemedicine? (Is it likely that compression will make lower bandwidths equally valuable, or that developments in telemedicine techniques will call for greater bandwidth? Or both?) How quickly are such technological changes expected to occur? Are they likely to affect particular medical specialties more than others?

BETTER VIDEO COMPRESSION REDUCES THE BANDWIDTH REQUIREMENTS GENERALLY. AT ADAMS COUNTY THE LINE WAS ALWAYS A FULL T1 BUT ONLY 1/2 IS REALLY USED. THE REST IS AVAILABLE FOR DISTANCE LEARNING AND VIDEO CONFERENCING. SOME VENDOR SYSTEMS REQUIRE HIGHER BANDWIDTHS HOWEVER (I.E., GRASS VALLEY SYSTEMS AT CLERMONT COUNTY HOSPITAL NEEDS A DS3 LEVEL LINE)

7. To what extent, and on what schedule, might ongoing network modernization, such as that occurring under private or state sponsored initiatives, make universal network service upgrades unnecessary?

THE SOMACS PROGRAM IN THE STATE OF OHIO IS IN THE PROCESS OF MAKING FULL POINT-TO-POINT T1 LINES AVAILABLE UPON REQUEST TO CIVIC, EDUCATIONAL, AND HEALTHCARE INSTITUTIONS IN THE STATE FOR A FLAT RATE OF $560 PER MONTH (VIDEO QUALITY). THE OHIO SCHOOLNET PROGRAM IS HELPING SCHOOL DISTRICTS TO PROVIDE NETWORK INFRASTRUCTURE WITHIN AND BETWEEN SCHOOLS. THESE PROGRAMS ARE SPURRING EFFORTS TO PUT CONNECTIONS BETWEEN HEALTHCARE INSTITUTIONS AND SCHOOLS FOR SEVERAL COMMUNITY HEALTH EDUCATION INITIATIVES. BOTH STATE PROGRAMS WILL BE VERY ACTIVE IN 1997. FOR EXAMPLE, THE SOMACS $560 PER MONTH VIDEO QUALITY T1 LINE CAN REPLACE THE $3,990 PER MONTH FEE THAT

AD.AMS COUNTY HOSPITAL /UNIVERSITY OF CINCINNATI CURRENTLY PAYS FOR ITS T1 LINE.